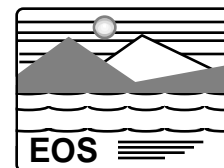# EOC TROUBLESHOOTING OVERVIEW

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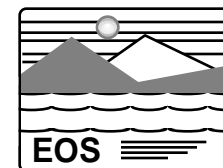**E-mail: rjones@eos.hitc.com**
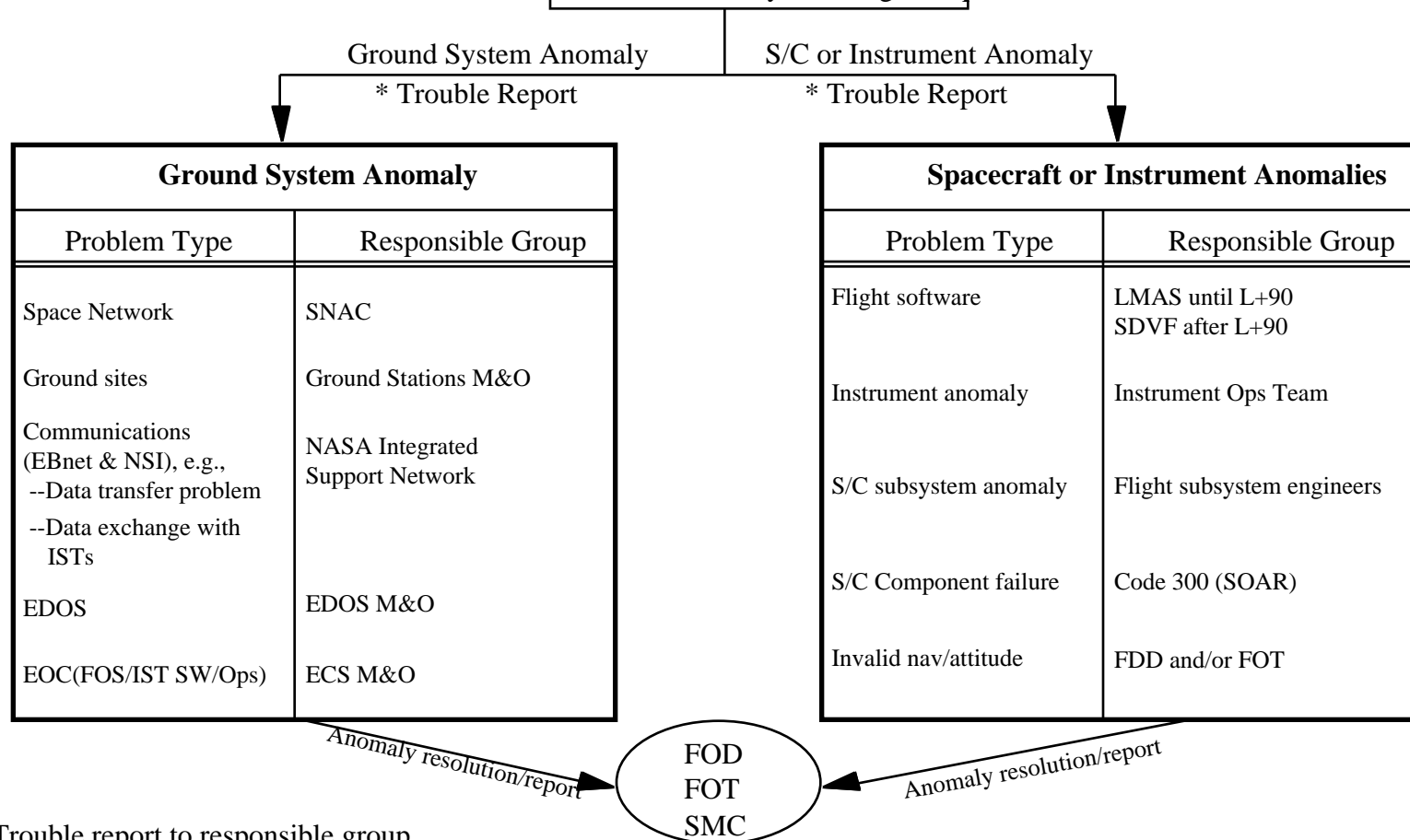
Topics To Be Addressed

- **EOC Offline Troubleshooting**

- **EOC Online Ground Segment Troubleshooting**

- **EOC Online Space Segment Troubleshooting**
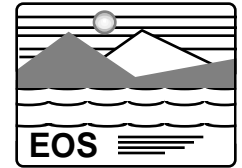
EOC Offline Troubleshooting

- Problem Detection
- Problem Identification
- Generate Trouble Report
- Form Anomaly Working Group

Ground System Anomaly
* Trouble Report

S/C or Instrument Anomaly
* Trouble Report

Ground System Anomaly

Problem Type	Responsible Group
Space Network	SNAC
Ground sites	Ground Stations M&O
Communications (EBnet & NSI), e.g., --Data transfer problem --Data exchange with ISTs	NASA Integrated Support Network
EDOS	EDOS M&O
EOC(FOS/IST SW/Ops)	ECS M&O

Spacecraft or Instrument Anomalies

Problem Type	Responsible Group
Flight software	LMAS until L+90 SDVF after L+90
Instrument anomaly	Instrument Ops Team
S/C subsystem anomaly	Flight subsystem engineers
S/C Component failure	Code 300 (SOAR)
Invalid nav/attitude	FDD and/or FOT

Anomaly resolution/report

FOD
FOT
SMC

Anomaly resolution/report
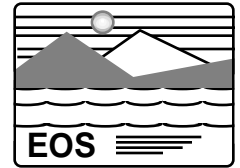
* Trouble report to responsible group

EOC Online Ground Segment Troubleshooting

- **Spacecraft communications**

- **External interfaces, ISTs, and SMC**

- **FOS RTS failover**

EOC Spacecraft Communications

- **EOC receives, processes, and displays status data during contact**
  - **Internally from LSM for hardware and software monitoring**
  - **From NCC on SN performance (UPD)**
  - **From EDOS on EDOS performance (CODA)**
    - » **No status from SMC, EBnet, FDF, etc.**
  - **EBnet: post trouble tickets on Web server**
- **If trouble with spacecraft communications, FOT contacts NCC Operations, EDOS Operations, and/or Nascom Communications Manager as appropriate to resolve problem(s)**

EOC External Interfaces, ISTs, and SMC
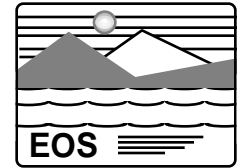
- **For external interfaces (e.g., FDF, EDOS)**

    – **EOC generates event messages for data transfer problems (e.g., problem with file transfer)**

    – **FOT deals directly with external interface operations personnel if applicable**

- **Trouble with ISTs**

    – **EOC receives status data from ISTs**

    – **Post trouble tickets on Web server**

        » **IOT informs FOT of trouble**

        » **Postpass FOT assist IOT in trouble resolution**

- **Role of SMC**

    – **SMC collects EOC LSM information for historical trending**

   – **Internal problems worked internally by FOT**

FOS Real-Time Server Failover
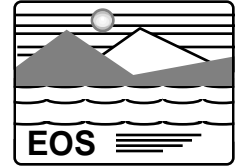
- **Failure recovery is an <u>automated</u>, not automatic function**
- **String manager processes on two RTSs respond to direction**
  - **ACTIVE process statuses changed to INACTIVE**
  - **BACKUP process statuses changed to ACTIVE**
- **Users with mirrored or tailored connections will be automatically connected to new ACTIVE string**

EOC Online Space Segment Troubleshooting
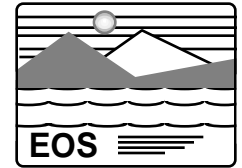
- **Problem detection – Trouble with spacecraft**

  - **FOS**

  - **FOT Online Engineer**

- **Problem notification**

  - **FOS generates Event Messages**

    » **Telemetry out-of-limits/delta violations**

    » **State Check violations**

    » **SSR playback problems**

    » **Activity Log entries**

  - **FOT Online Engineer informs Shift Supervisor**

- **Recovery: FOT Online Personnel**

  - **OICD/Operations Agreement**

  - **Preapproved Contingency Operation Procedure**

    » **FOS recommends via event message**

    » **FOT Online Engineer recommends to Shift Supervisor**
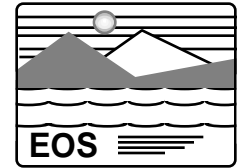
- **Recovery: FOT Offline personnel**
  - **There is no preapproved COP for anomaly**
  - **Online Engineer collects data**
  - **Online Engineer informs Shift Supervisor of problem**
  - **Online Engineer calls**
    - » **FOT Manager**
    - » **FOT Flight System Manager**
    - » **FOT Operations Manager**
    - » **GSFC Flight Operations Director**
  - **FOT Flight System Manager and/or FOT Spacecraft Subsystem Engineer arrive at EOC**
    - » **Tiger Team looks at data collected by Online Engineer**
    - » **Comes up with plan of attack**
    - » **Recovers spacecraft**